

Claim 16, line 3, after "polymer" insert --which--.

REMARKS

Claims 1-22 are all the claims pending in the application.

I. Formal Matters

Applicants filed an Information Disclosure Statement on October 19, 1999. To date the Examiner has not acknowledged receipt of the Information Disclosure Statement. The Examiner is requested to acknowledge receipt of the Information Disclosure Statement filed October 19, 1999 and to initial and return a copy of the Form PTO-1449.

II. The Rejection Under 35 U.S.C. §112, Second Paragraph

Claims 2 and 9 are rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In particular, the Examiner objects to the language "and/or."

Applicants respectfully submit that the phrase "a fluorine and/or silicon-containing surfactant" is definite and its meaning readily understood by one of ordinary skill in the art. However, to advance the prosecution, the term "and/or" has been removed.

For the above reasons, it is respectfully submitted that Applicants' claims are clear and definite and it is requested that the rejection under 35 U.S.C. §112 be reconsidered and withdrawn.

III. The Rejection Under 35 U.S.C. §103(a)

Claims 1-22 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Aoai in view of Iwasa '111.

Applicants respectfully submit that the present invention is not anticipated by or obvious over Aoai in view of Iwasa '111 and request that the Examiner reconsider and withdraw this rejection in view of the following remarks.

As noted by the Examiner, Aoai does not teach or suggest the use of polymers that have an alicyclic hydrocarbon skeleton. Further, Aoai does not disclose any working examples where a surfactant is used, much less a fluorine-containing surfactant or a silicon-containing surfactant.

Applicants' claimed invention relates to a positive photosensitive resin composition comprising the combination of a polymer having alicyclic hydrocarbon skeletons, a compound which generates an acid upon irradiation with actinic rays, a nitrogen-containing basic compound and at least one of a fluorine-containing surfactant and a silicon-containing surfactant. Applicants have discovered that, by the use of the polymers that have alicyclic hydrocarbon skeletons, the nitrogen-containing basic compound and the claimed surfactants, a positive photosensitive resin composition may be made which provides unexpectedly superior results.

As can be seen from the results shown in Tables 2 and 3, all the inventive photosensitive resin compositions produced very few development defects and form patterns having a rectangular profile. On the other hand, in the comparative examples that contained neither the nitrogen-containing basic compound nor the surfactant, nor both, significant development defects occurred. Further, when a comparative surfactant was used, the development defects were relatively few, but the resist profile was not good.

As can be seen from the results shown in Tables 6 and 7, the inventive compositions provided resist films with very few development defects, which form patterns with a rectangular profile and have excellent sensitivity, resolution and developability.

As can be seen from the results shown in Table 9, the number of each of the types of development defects was very small in every case of the inventive photosensitive resin compositions. On the other hand, in the comparative photosensitive resin compositions, the development defects were considerably large in number. In particular, the number of development defects roughly doubled in the case of Comparative Example 4b using ethyl lactate alone as the solvent, compared with the examples using mixed solvent systems. In the case of Comparative Example 5b using a comparative surfactant, the number of development defects was more than twice those in the present cases of using the same mixed solvent system.

As can be seen from the results shown in Table 11, the number of each type of development defects was very small in every example of the inventive photosensitive resin compositions. In particular, there were no or very few, if any, development defects in the cases of Examples 3c-7c using three kinds of solvents. On the other hand, in the comparative photosensitive resin compositions, the development defects were markedly large in number. In particular, the number of development defects in the case of Comparative Example 4c using ethyl lactate alone as the solvent was more than twice that in the case of Example 1c. In Comparative Example 5c, using a comparative surfactant, the number of development defects roughly doubled, compared with the case of Example 1c.

PHS/BES used in Examples 5 and 6 of Aoi is considered by Applicants to be closest to polymer E used in Comparative Examples 6b, 7b, 6c and 6d of Tables 9 and 11 of Applicants' specification.

The positive photosensitive resin compositions according to the present invention have excellent resist characteristics, coating suitability, storage stability and safety. In particular, they unexpectedly have the advantage of being free of the development-defects problem. Therefore, the present positive photosensitive resin compositions are especially useful for lithography utilizing ArF excimer laser beams as the exposure light source. The positive photosensitive resin compositions according to the present invention are effective in forming fine patterns meeting the requirements for the production of semiconductor elements.

In conclusion, it is respectfully submitted that the references cited by the Examiner do not teach or render obvious the claimed combination of a polymer having alicyclic hydrocarbon skeletons, a compound which generates an acid upon irradiation with actinic rays, a nitrogen-containing basic compound and at least one of a fluorine-containing surfactant and a silicon-containing surfactant and therefore, that the Examiner has not established a prima facie case of obviousness. Further, the comparative data in the specification shows the unexpected improvements achieved by the use of Applicants' claimed invention.

For the above reasons, it is respectfully submitted that the subject matter of claims 1-22 is neither taught by nor made obvious from the disclosures of Aoi or Iwasa '111, either alone or in combination, and it is requested that the rejection under 35 U.S.C. §103(a) be reconsidered and withdrawn.

IV. Conclusion

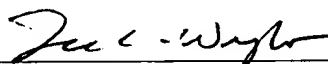
In view of the above, Applicants respectfully submit that their claimed invention is allowable and ask that the rejection under 35 U.S.C. §112 and the rejection under 35 U.S.C. §103 be reconsidered and withdrawn. Applicants respectfully submit that this case is in condition for allowance and allowance is respectfully solicited.

If any points remain at issue which the Examiner feels may be best resolved through a personal or telephone interview, she is kindly requested to contact the undersigned at the local exchange number listed below.

Applicants hereby petition for any extension of time which may be required to maintain the pendency of this case, and any required fee for such extension is to be charged to Deposit Account No. 19-4880.

Respectfully submitted,

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